Coulomb Technologies

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Fueling The Electric Transportation Industry

California Energy Commission Presentation October 12, 2009

Richard Lowenthal

Company Overview

A Leading Supplier of Networked EV Infrastructure Products and Services

- **Company:**
  - Founded in 2007 to develop Networked Electric Vehicle Charging Stations through convergence of networking, grid, and electric vehicle technologies
  - Led by Networking Technology Executives from Cisco, 3Com, Lucent, Echelon

- **Technology:**
  - Products are networked charging stations and network-based applications, including billing, station management, smart grid integration, and fleet management
  - Shipped first ChargePoint Networked Charging Stations in December 2008, ChargePoint Network opened to public in San Jose in January 2009

Coulomb's Business

- **We sell charging stations**
  - Level I and Level II stations with global standards
  - Public charging stations for curbside, parking lots and schools
  - Commercial charging stations for workplaces, apartments, and condominiums
  - Home charging stations for garages and car ports
  - Future DC charging
- **We provide applications for operating large scale vehicle charging infrastructure**
  - Billing System to cover energy costs, maintenance costs, and capital
  - Advanced Metering Infrastructure interface
  - Smart Grid integration tools including demand response and utility incentive pricing programs
  - Fleet management
    - Charge management
    - Analysis of energy use, greenhouse gas savings
  - Remote Station Management – for high uptime and low support costs
  - Driver Charging Assistance
    - Find available stations, with real time status
    - Notify me when my car's charged, and needs charge.
    - Optimize cost of charging
    - Request new stations

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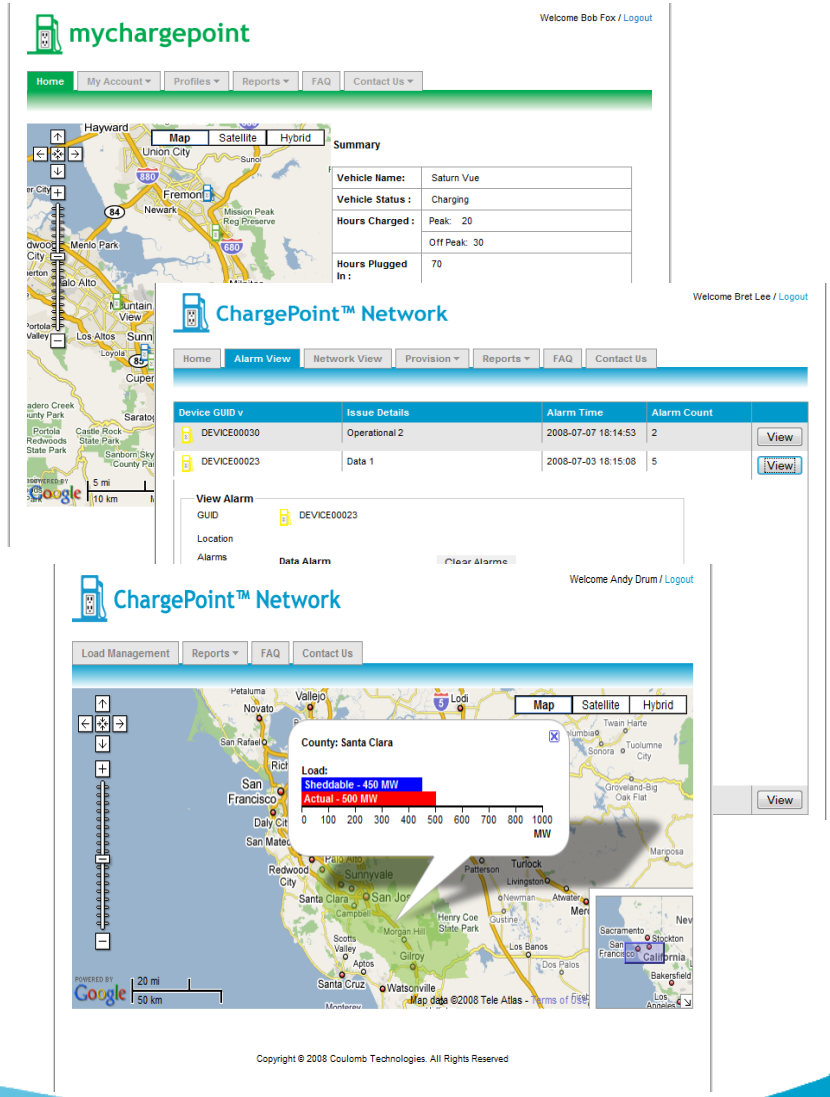
ChargePoint™ Networked Charging Stations & ChargePoint™ Applications



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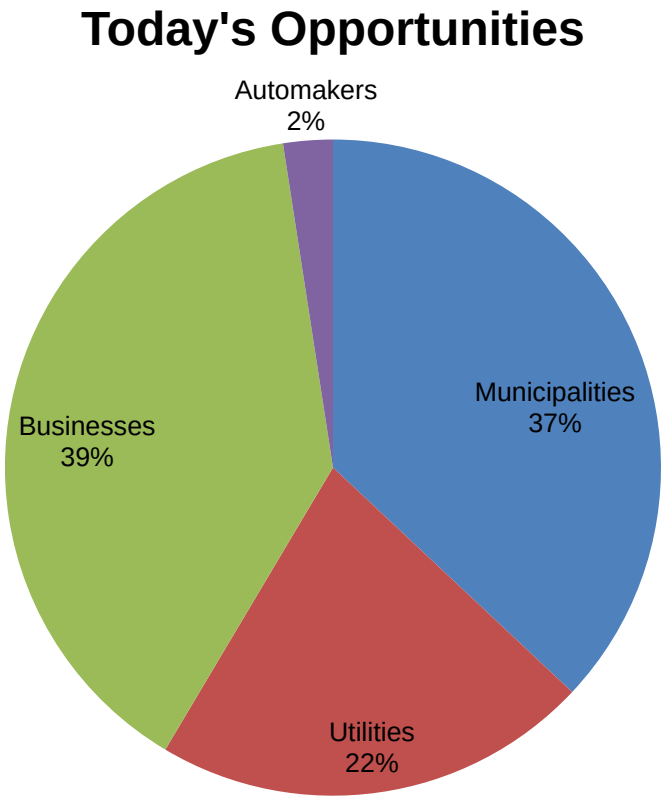
Customer – Pipeline Overview



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RECENT AND PUBLIC CHARGING STATION DEPLOYMENT

- **ChargePoint Networked Charging Stations Installed To-date**
  - **San Francisco**
  - **San Jose**
  - **Campbell**
  - **Sonoma county**
  - **Walnut Creek**
  - **Chico**
  - **Hillsborough, Oregon**
  - **Chicago, Ill**
  - **Nashville Tenn**
  - **Cary North Carolina**
  - **Madison Wisconsin**
  - **Baltimore Maryland**
  - **Amsterdam, Netherlands**
  - **Bochum Germany**
  - **Prague, Czech Republic**
  - **Diepenbeek, Belgium**

And McDonalds, Apple, Starwood, ACE Parking, Hyatt, etc.

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EVSE DESIGN AND FEATURES

- Must support all PEVs from Scooters to Buses
- Must be compliant to UL standards
- Must have remote monitoring in order to keep high uptime
- Should allow for real time occupancy status by web or smartphone
- Anyone should be able to charge at any EVSE
- Should all have Demand Response, at least
- A station owner should have the option of billing for EVSE use

EVSE Costs

- Level II Stations cost from $1,000 - $4,000 depending on indoor/outdoor, shared/dedicated, inclusion of Level I or not
- Installation varies from $500 to $15,000!
- We use an average of $5,000 for EVSE + installation for shared EVSE
- CEC may want to rebate less than the full amount
- Many times a city will have their Public Works department install
- Businesses sometimes do their own installations too
- Upgrade or supplements to existing stations have very low installation costs

Every City Should Have Stations

- Right now I can't use my MINI-E to go from San Jose to a meeting in San Francisco
- 500 cities times 5 stations times $5,000 grant = $12.5M
- Every one you fund puts three people to work for a day
- Cities and others often want to do their own install – this will stretch CEC money
- Most cars will charge at 3KW or 6KW, meaning if you charge for an hour your car will go 15 or 30 more miles – don't focus too much on highways
- Making sure all cities and communities welcome EV's will have a big impact on growing the EV market
- Many city dwellers have no home garage

We need PEV readiness programs

- Need $1M grant for
  - Model ordinance for 1-day installation of EVSE (including permitting and inspection
  - Model ordinance on rules that require EVSE wiring in all new garages
  - Model ordinance on allocation of public parking space and policies
    - E.g.: Free EV parking, EVSE at transit, curbside parking space

Growth

- We estimate that California will have 100,000 PEV's by 2012
- Each one needs two places to charge a day, one while you sleep, one while you work
- The home garage only counts for 25% of those
- We need 150,000 EVSE outside the home garage by 2012

CEC Role

- We need CEC help in the early days

- CEC could solve the chicken-and-egg problem. Provide stations initially to give momentum to the EV market, otherwise San Franciscans won't buy cars

- The CEC can also help dramatically by funding readiness programs

- But we also feel that once there are cars out there, infrastructure should be self-supporting i.e.:
  - Billing systems so that drivers pay for maintenance and electricity
  - Car buyers got their boost from CEC but now buy on their own because they're confident there will be places to charge
  - Utilities help with residential charging

CEC Funding Proposal

- $1M for model resolution development grants
  - 1 day installation, garage wiring, public parking space allocation

- $12.5M to ensure that every city has stations

- $25M in matching grants for utilities, municipalities, or businesses who will pay for their own EVSE installations – 10,000 stations

Utility Role

- The utilities should play a large role
- For the residential market, EVSE should be “meters” and be rate-based
  - Taking the cost of EVSE and installation out of the car-buying experience would be a huge win for growing this industry
- Outside the single-family residence, things get more complicated and EVSE may remain a competitive market
  - Mobile consumers may encounter many utilities a day
  - Billing gets challenging, we need identification and authentication
- EVSE, cars, drivers, and utilities need to cooperate to include incentives, controls, and reporting for Smart Grid charging in all cases
- Integration with AMI is a must

THANK YOU

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